



Original article

Accuracy of clinical diagnosis in knee arthroscopy

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A prospective study of 238 patients was performed in a district general hospital to assess current diagnostic accuracy rates and to ascertain the use and the effectiveness of magnetic resonance imaging (MRI) scanning in reducing the number of negative arthroscopies. The pre-operative diagnosis of patients listed for knee arthroscopy was medial meniscus tear 94 (40%) and osteoarthritis 59 (25%). MRI scans were requested in 57 patients (24%) with medial meniscus tear representing 65% (37 patients). The correlation study was done between pre-operative diagnosis, MRI and arthroscopic diagnosis. Clinical diagnosis was as accurate as the MRI with 79% agreement between the pre-operative diagnosis and arthroscopy compared to 77% agreement between MRI scan and arthroscopy. There was no evidence, in this study, that MRI scan can reduce the number of negative arthroscopies. Four normal MRI scans had positive arthroscopic diagnosis (two torn medial meniscus, one torn lateral meniscus and one chondromalacia patella). Out of 240 arthroscopies, there were only 10 normal knees (negative arthroscopy) representing 4% of the total number of knee arthroscopies; one patient of those 10 cases had MRI scan with ACL rupture diagnosis.

Key words: Clinical diagnosis – Knee arthroscopy – Magnetic resonance imaging

In the late 1960s and early 1970s, orthopaedic surgeons relied completely on clinical examination in the diagnosis of knee disorders. However, in the 1970s and 1980s numerous reports established the value of arthroscopy in the diagnosis and treatment of a variety of knee disorders.^{1–3} Arthroscopy has allowed exploration of the clinical evaluations, laboratory tests, plain radiographs, and double contrast arthrograms as diagnostic tools for knee problems.^{4–7} It can be very helpful for the surgeon to know the extent that diagnostic arthroscopy would confirm, add to, or contradict the clinical impression. Curran and Woodward⁸ studied 396 knee arthroscopies and found that the total clinical accuracy rate was only 71%.

In the late 1980s, the development of magnetic resonance imaging (MRI) allowed the diagnosis of internal derangements of the knee without arthroscopy.⁹ MRI had previously been shown to be an accurate method of

assessing knee pathology, particularly the menisci and anterior cruciate ligament correlating closely with arthroscopy.^{10,11} The findings demonstrated with MRI were, therefore, used as the standard against which clinical assessment was judged. MRI has been shown to be an accurate technique in the assessment of internal derangement of the knee when compared to arthroscopy,^{12–14} but this relative value of the two methods in the clinical and cost-effective management of patients with suspected internal derangement is less certain. It has been suggested that MRI could be used to exclude arthroscopically treatable lesions in one-third to one-half of patients being subjected to diagnostic arthroscopy.¹¹ However, statistics will vary from one centre to another depending on who reports the MRI scan and on his/her experience and proficiency with MRI scan of the knee pathology.

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Table 1 Pre-operative diagnosis

Pre-operative diagnosis	Patients (n)	(%)
Medial meniscal tear	94	40
Osteoarthritis	59	25
Osteochondral defect	22	9
Lateral meniscal tear	20	8
Plica	10	4
Chondromalacia patella	10	4
Loose bodies	4	2
ACL rupture	3	1
Other	14	6
Patella maltracking	5	
Knee pain	3	
Medial meniscal cyst	2	
Discoid lateral meniscus	1	
Synovial inflammation	1	
Adhesions	1	
Meniscal tear? Side	1	

We aimed, in this prospective study, to assess current clinical diagnostic accuracy rates and to ascertain the usefulness and effectiveness of MRI in reducing the number of negative arthroscopies in a district general hospital (DGH).

Patients and Methods

Information was collected prospectively for all patients undergoing knee arthroscopy under the care of 9 different orthopaedic consultants during the 6-month period from September 1999 to March 2000. The data were collected using a proforma and validated and analysed using Microsoft Excel. The orthopaedic surgeon in the theatre completed the proforma. The data collected were age, sex, pre-operative diagnosis and the grades of the clinician, MRI scan diagnosis if it was requested and arthroscopic diagnosis and the grade of the surgeon. The decision to request an MRI scan was at the discretion of the individual consultant at the time of the initial consultation. All the MRI scans were reported by radiology consultants.

Results

A total of 240 arthroscopies were performed on 238 patients over a 6-month period from September 1999 to March 2000. There were 156 (65%) males and 84 (35%) females. The male ages ranged from 16–84 years (mean, 43 years; median, 41 years). The female ages ranged from 17–78 years (mean, 50 years; median, 51 years). Of the total, 79% (189 patients) were treated pre-operatively by 3 consultants with specific interest in knee arthroscopy and 21% (51 patients) were treated by the other 6 consultants. The pre-operative diagnosis was made by consultants in

Table 2 MRI requested for different pre-operative diagnoses

Pre-operative diagnosis	MRI requested (n)	(%)
Medial meniscal tear	37	65
Lateral meniscal tear	6	11
Osteochondral defect	6	11
Osteoarthritis	3	5
ACL rupture	2	4
Chondromalacia patella	1	2
Knee pain	2	4

219 patients (91%) and by non-consultant grades (staff grade and specialist registrar) in 21 patients (9%). The pre-operative diagnosis of patients listed for knee arthroscopy was medial meniscus tear 94 (40%), osteoarthritis 59 (25%) and other diagnoses as listed in Table 1.

MRI scans were requested in 57 patients (24%) for different pre-operative diagnosis with medial meniscus tear representing 65% (37 patients) and other diagnoses as shown in Table 2. In these 57 patients, the age range was 17–72 years (mean, 41 years; median, 38 years). There were 35 (61%) males and 22 (39%) females. The male age range was 19–65 years (mean, 37 years; median, 38 years). The female age range was 17–72 years (mean, 47 years; median, 46 years). Of the MRI scans, 84% (48 patients) were requested by the 3 consultants with special interest in knee arthroscopy and 16% (9 patients) were requested by the other 6 consultants.

The correlation study was performed between pre-operative diagnosis, MRI and arthroscopic diagnosis in those 57 patients. There was full agreement in 73%, partial agreement in 7% and no agreement in 20% between pre-operative diagnosis and MRI. The correlation between pre-operative diagnosis and arthroscopy was 62% full agreement, 14% partial agreement and 24% no agreement. The correlation between MRI and arthroscopy was 61% full agreement, 16% partial agreement and 23% no agreement. Correlation between pre-operative diagnosis, MRI and arthroscopy was only 50% (Fig. 1).

The arthroscopic diagnosis was made mainly by consultants in 183 patients (76%) and by non-consultant grades (staff grade and specialist registrar) in 56 patients (24%). Also, the correlation between the arthroscopic diagnosis and pre-operative diagnosis was made in 238 patients (2 patients were excluded as pre-operative diagnosis was not completed). There was full agreement in 148 patients (62%), partial agreement in 41 patients (17%) and no agreement in 49 patients (21%; Fig. 2).

Full agreement means that the arthroscopic diagnosis confirmed the pre-operative diagnosis and MRI diagnosis without any other pathology in the knee. Partial agreement means that the arthroscopic diagnosis

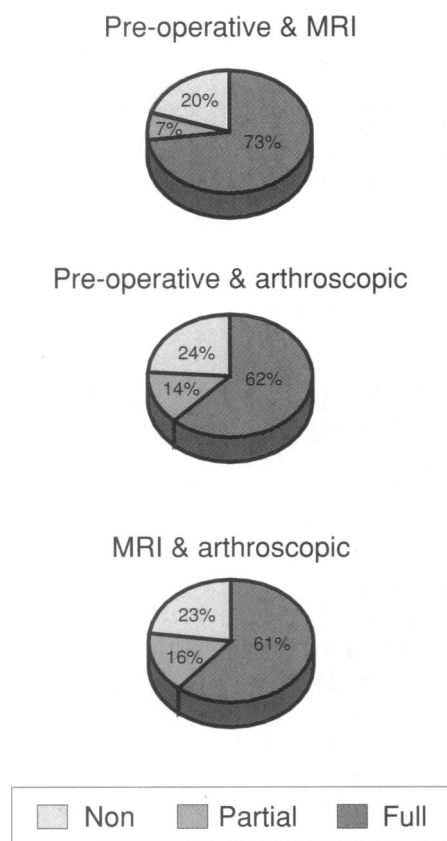


Figure 1 Correlation between pre-operative diagnosis, MRI and arthroscopy in 57 patients.

confirmed the pre-operative diagnosis and MRI diagnosis in addition to other pathology in the knee which was not diagnosed beforehand (e.g. pre-operative diagnosis and MRI diagnosis was medial meniscus tear but the arthroscopic diagnosis was medial meniscus tear and lateral meniscus tear or anterior cruciate rupture).

Out of the 240 arthroscopies, there were only 10 normal knees (negative arthroscopy) representing 4% of the total number of knee arthroscopies; one patient of these 10 cases had a MRI scan with ACL rupture diagnosis.

Discussion

Confidence in clinical diagnosis of knee pathology is very important. The type of injury, detailed history and clinical symptoms are reliable as indicators of likely pathology. Reliability may be improved by experience and clinical diagnosis can be made with sufficient confidence to justify knee arthroscopy.

MRI scans are available in most DGHs in Great Britain and, with the increasing availability of MRI, there is

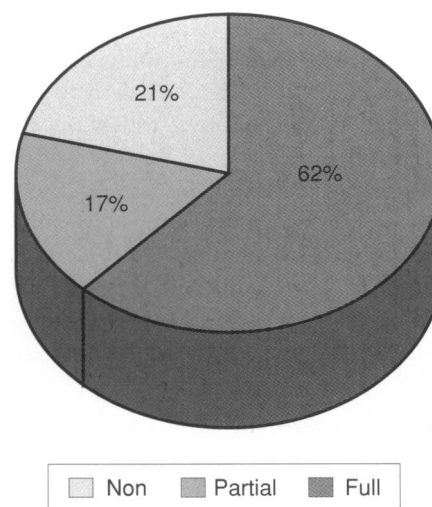


Figure 2 Correlation between pre-operative diagnosis and arthroscopy in 238 patients.

pressure to use this non-invasive, non-radiological technique to help make diagnosis prior to embarking upon arthroscopy. However, the waiting time for a MRI scan in a DGH varies from a few weeks to a year. Thus, a patient with suspected pathology could wait for approximately one year before the clinical diagnosis is confirmed and treatment initiated.

Our data suggest that clinical assessment alone should identify the majority of knee pathology. This study shows that clinical diagnosis is as accurate as MRI with 79% agreement between the pre-operative diagnosis and arthroscopy compared to 77% agreement between MRI scan and arthroscopy.

This study also shows no evidence that a MRI scan can reduce the number of negative arthroscopies. Four normal MRI scans had positive arthroscopic diagnosis (two torn medial meniscus, one torn lateral meniscus and one chondromalacia patella) after the surgeon decided to proceed to knee arthroscopy relying completely on the clinical diagnosis and ignoring the result of MRI scans. In the 10 negative arthroscopy group, one patient had a MRI diagnosis with anterior cruciate rupture, which was excluded arthroscopically. The MRI scan reports were inconclusive on several occasions and matched with neither the clinical nor the arthroscopic diagnosis, despite being reported by a consultant radiologist. In other different previous studies, MRI scan showed improved and acceptable levels of accuracy.^{10,15-18} However, in these studies, an experienced musculoskeletal radiologist was involved. In DGHs, often there is no subspecialty consultant radiologist in musculoskeletal radiology and

the accuracy of MRI reports is lower. This study shows that clinical diagnosis was as accurate as MRI scans in a DGH and can be used as a reliable method to justify knee arthroscopy. The indications for MRI need to be clearly defined especially since it is known to have quite a high false positive rate.^{19,20} MRI scan of the knee represents a useful adjunct to, but not a substitute for, careful clinical diagnosis. The value of MRI scanning in a DGH depends upon the availability of experienced musculoskeletal radiology.

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